BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XX. Lancaster, Pa., September 15, 1893. No. 9.

Lichens of the Black Hills and their Distribution.*

By Thomas A. Williams.

The thoughts presented in this paper are based upon a short study of the specimens in three collections from the Black Hills of South Dakota. The first of these was made by Dr. C. E. Bessey in the summer of 1891 at Custer City; the second by myself in August of the same year in the region surrounding Rapid City; and the third by P. A. Rydberg during the summer of 1892 mainly at and near Custer City.

One of the first points brought out by a study of the lichen flora of the Black Hills is that the number of rock lichens is, comparatively, very large, while tree-loving species are very scarce. Of the 83 species and varieties determined, 44, or more than 53 per cent., have so far been found on rocks only; 22, or nearly 27 per cent., grow on earth, while but 8, or less than 10 per cent., are found growing on trees exclusively. Six forms occur on both trees and rocks, one on both earth and rocks, one on both earth and rotten logs, and one parasitic on the thallus of various Cladoniæ.

Comparing this with a list of lichens found in Eastern Nebraska, the difference is at once seen to be quite striking. In this latter list, which consists of 115 species and varieties, 32, or nearly 28 per cent., grow on rocks; 68, or nearly 58 per cent., grow on

* Read before the Section of Botany, A. A. A. S., Madison Meeting, August, 1893.

trees; 13, or a little more than 9 per cent., are found growing on earth, and two species are parasitic. On the other hand, if we compare the Black Hills list with one by Henry Willey, based upon collections made in the Rocky Mountains by Dr. Coulter, found in the report of the latter in the United States Geological Survey of the Territories, we find a greater similarity, so far as distribution is concerned. In this case 34, or about 52 per cent., were collected on rocks; 18, or nearly 28 per cent., on earth; 12, or more than 18 per cent., on trees, and a single species on both trees and rocks. These numbers may be readily followed out in the appended table:

	Numbers.			Per Cents.		
Habitat.	Black Hills.	Eastern Nebr.	Rocky Mts.	Black Hills.	Eastern Nebr.	Rocky Mts.
On trees,	8	68	12	10	58	18
On rocks,	44	32	34	53	28	52
On trees and rocks,	6	. . .	1	. . .	. . .	. . .
On earth,	22	13	18	27	9	28
On earth and rocks,	1	. . .	. . .	. . .	. . .	. . .
On earth and wood,	1	. . .	. . .	. . .	. . .	. . .
Parasitic,	1	2	. . .	. . .	. . .	. . .
Totals,	83	115	65			

Twenty-five of the lichens found in the Black Hills are found also in Eastern Nebraska and 20 are found in the Rocky Mountains, while the Rocky Mountain list contains 16 species found in Eastern Nebraska. Nine forms are common to the three regions.

It would seem from this that the proportion of species common to the Black Hills and Eastern Nebraska and to the former locality and the Rocky Mountains is nearly the same when the numbers in all the lists are considered. From undetermined material on hand, however, it is very evident that when thoroughly worked up, the lichen flora of the Black Hills will show a great many more species found also in the Rocky Mountains.*

* Most of the specimens examined have come from the eastern side of the Hills, and we may expect more Rocky Mountain forms from the western side, for reasons given later.

Of the 25 lichens common to Eastern Nebraska and the Black Hills, 10 are found on rocks, 5 on earth and 4 on trees. Of the 20 common to the Black Hills and Rocky Mountains, 11 grow on rocks, 5 on soil and but 3 on trees.

The 83 species and varieties found in the Black Hills belong to 22 genera, the three largest being *Lecanora* with 16 representatives, *Placodium* with 10, and *Cladonia* with 7, though *Lecidea*, in the Tuckermanian sense, when well worked over will probably give nearly or quite as many species as *Lecanora*. The lichens of the Rocky Mountain list are distributed among 17 genera, the three largest being *Lecanora* with 17 species and varieties, *Placodium* with 10 and *Lecidea* with 8.

Fourteen of the 17 genera are also found in the Black Hills and 13 in Eastern Nebraska, 12 of these being common to all three regions. The Nebraska list includes 31 genera.

Turning now to the distribution given by Tuckerman* to the species found in the Black Hills, and 45 are found to be general throughout the United States, 24 are Alpine or sub-Alpine, 6 are peculiar to the Pacific Coast, 3 to the Atlantic Coast, 3 to the great plains, and one a local form of a widely distributed species. One species, *Rinodina mamillana*, Tuckerm., has only been reported from the Sandwich Islands and the Galapagos Islands. Again, 43 of the species have been reported from Arctic America, while but 26 have been found in the Southern States, and 10 of the 26 are found only in the mountains, leaving but 16 that can really be said to belong to the South, and these are all included in those species whose distribution is said to be general throughout the United States. Sixty-two species are found in Europe, being either Alpine, sub-Alpine or confined to the North of of Europe. Seven species are peculiar to the United States.

A comparison of the Black Hills list with Tuckerman's Lichens of California, Oregon and the Rocky Mountains, shows that 24 of the species occur on the coast, while 30 are found in the Rocky Mountains, the 30 including nearly every one of the 24 reported from the coast. From this list and the one by Mr. Willey it may be seen that in all 34 species of the Black Hills list have been found in the Rocky Mountains.

---

*Synopsis North American Lichens, Parts I. and II.

From the foregoing the following facts may be gleaned:

1. In the lichen flora of the Black Hills the rock lichens greatly predominate and have a more general distribution, the earth forms coming next.

2. This lichen flora is essentially northern in character.

3. It is more closely allied to the flora of the Rocky Mountains than to that of Eastern Nebraska and Dakota and hence, of course, to that of the Mississippi Valley.

4. That though intermediate between the lichen flora of the Rocky Mountains and that of the Mississippi Valley, it is not so distinctly so as the geographical position of the Black Hills region might lead us to expect.

The explanation of these conclusions can be found, undoubtedly, in the climate and geological make-up and history of the Black Hills region. The wide stretch of prairie, with its hot dry winds, lying between the Black Hills and the Lower Missouri Valley, as well as the Mississippi Valley proper, is not favorable to the development and growth of tree-loving species, even when plenty of trees are to be found. On the other hand, saxicoline and terricoline species survive because better protected and more likely to get enough moisture to retain life even in times of excessive drought. This condition of things would break the connection between the Black Hills and Mississippi Valley floras, and would tend to prohibit an interchange of forms except those few earth and rock forms able to exist.

East and south of the Black Hills lies the famous Bad Land region of South Dakota and Nebraska. This region is subject to hot, dry winds, mainly from the south or southeast, which strike the Black Hills on the east and south. As a result tree lichens are scarce in this part of the Hills, becoming more and more plentiful as we go farther into the heart of the region. The larger part of the tree lichens in the collections examined came from the cañons and gulches well up in the Hills. Rock lichens, particularly species of *Placodium*, *Lecanora* and *Rinodina*, are common all along the eastern edge of the Hills, as well as in the foot hills bordering them.

Geologically, the Black Hills are largely composed of various kinds of sandstone, limestone and granite, all of which furnish

substrata very favorable to lichen growth. This is particularly true of the sandstones, which usually furnish the greatest variety of forms, as well as quantity of individual species. Furthermore, the Black Hills are very old, geologically speaking, and once covered a much greater area than at the present time, with probably closer connections with the Rocky Mountains. Alpine and northern forms common to these regions very likely came in with the same influx of species that sprinkled the mountain tops of both sides of our continent with closely allied forms.

List of Species and Varieties.

Ramalina pollinaria, Ach. Rocks. Custer City (Bessey.)

Usnea barbata (L.) Fr. var. ———? always infertile. Trees. Custer City (Rydberg, Bessey); Rapid City.

Alectoria jubata (L) Fr. var. *implexa*, Fr. Trees Custer City (Bessey).

Theloschistes polycarpus (Ehrh.) Tuckerm. Trees, Rapid City.

Parmelia olivacea (L.) Ach. Common on trees, Custer City (Rydberg); Rapid City.

Parmelia olivacea (L.) Ach. var. *panniformis*, Nyl. Rocks, Custer City (Bessey).

Parmelia caperata (L.) Ach. Common on trees and rocks. Mostly infertile, except on the latter substrate. Custer City (Rydberg); Rapid City.

Parmelia conspersa (Ehrh.) Ach. Common on stones. Custer City (Bessey); Rapid City.

Parmelia molliuscula, Ach. High, dry and sterile soil near Rapid City. Also common in the Bad Lands of Nebraska and the Dakotas.

Physcia pulverulenta (Schreb.) Nyl. Trees. Rapid City.

Physcia pulverulenta (Schreb.) Nyl. var. *muscigena* (Whlnb.) Schær. On earth among moss at bases of trees. Custer City (Bessey).

Physcia stellaris (L.) Tuckerm. Trees and rocks. Rapid City.

Umbilicaria rugifera, Nyl (?). Rocks. Rapid City.

Umbilicaria cylindrica (L.) Delis. Plentiful on rocks. Custer City (Rydberg); Rapid City.

Umbilicaria Muhlenbergii (Ach.) Tuckerm., var. *alpina*, Tuckerm. Rocks. Rapid City; Custer City (Bessey).

Umbilicaria vellea (L.) Nyl. Rocks. Rapid City.

Umbilicaria pustulata (L.) Hoffm. Rocks. Custer City (Bessey).

Sticta amplissima (Scop.) Mass. Trunks of trees and rocks. Custer City (Bessey); Rapid City.

Peltigera aphthosa (L.) Hoffm. Earth among moss. Custer City (Rydberg); Rapid City.

Peltigera horizontalis (L.) Hoffm. Earth, etc. Custer City (Bessey); Rapid City.

Peltigera rufescens (Neck.) Hoffm. Earth, etc. Custer City (Bessey); Rapid City.

Peltigera canina (L.) Hoffm. Earth, etc. Custer City (Bessey); Rapid City.

Peltigera canina (L.) Hoffm., var. *spongiosa*, Tuckerm. Earth among moss in deep cañons above Rapid City.

Peltigera canina (L.), Hoffm., var. *membranacea*, Ach. Earth, etc. Rapid City.

Solorina saccata (L.) Ach. Moist earth among moss on rocks in deep cañons. Plentiful. Rapid City.

Pannaria nigra (Huds.) Nyl. Common on rocks, particularly limestone. Rapid City.

Collema pulposum (Bernh.) Nyl. (?) Moist earth. Rapid City.

Leptogium lacerum (Sw.) Fr. Among moss. Rapid City.

Leptogium dactylinum, Tuckerm. Rocks. Custer City (Bessey); Rapid City.

Leptogium pulchellum (Ach.) Nyl. (?) Rocks and among moss. Rapid City.

Placodium elegans (Link) DC. Plentiful on rocks. Custer City (Rydberg, Bessey); Rapid City.

Placodium murorum (Hoffm.) DC., var. *miniatum*, Tuckerm. Rocks. Custer City (Bessey); Rapid City.

Placodium cirrochroum (Ach.) Hepp. This beautiful species occurs plentifully on rocks at Rapid City, but is always sterile.

Placodium fulgens (Sw.) DC. Sterile and calcareous soils. Rapid City. Not rare, but not nearly so plentiful as in the Bad Lands.

Placodium fulgens (Sw.) DC., var. *bracteatum*, Ach. With the species.

Placodium mycrophyllinum, Tuckerm. Dead wood and bark of trees, Custer City (Rydberg); Rapid City. A common species.

Placodium citrinum (Hoffm.) Leight. Very plentiful on rocks. Custer City (Bessey); Rapid City.

Placodium ferrugineum (Huds.) Hepp., var. *Bolanderi*, Tuckerm. Rocks. Custer City (Bessey), rare.

Placodium vitellinum (Ehrh.) Næg. and Hepp. Rocks. Custer City (Bessey); Rapid City. Not uncommon.

Lecanora rubina (Vill.) Ach. Rocks. Custer City (Bessey, Rydberg); Rapid City. Very common.

Lecanora rubina (Vill.) Ach., var. *opaca*, Ach. With the species.

Lecanora muralis (Schreb.) Schær. Rocks. Rapid City.

Lecanora muralis (Schreb.) Schær., var. *saxicola*, Schær. Rocks. Rapid City. Not uncommon.

Lecanora frustulata (Dicks.) Mass. Rocks. Custer City (Bessey), and what is probably this species at Rapid City.

Lecanora sordida (Pers.) Th. Fr. Rocks. Rapid City.

Lecanora subfusca (L.) Ach. Trees, wood and stone. Rapid City.

Lecanora Haydeni, Ach. Rocks and dead wood. Rapid City. Not uncommon and very variable.

Lecanora melanaspis (Wahl.) Ach. Rocks. Rapid City, and what seems to be the same thing at Custer City (Bessey). Rare.

Lecanora cinerea (L.) Sommerf. Rocks. Custer City (Bessey); Rapid City. Common.

Lecanora calcarea (L.) Sommerf. Rocks. Rapid City.

Lecanora chlorophana (Wahl.) Ach. Rocks. Rapid City.

Lecanora xanthophana, Nyl. Rocks. Rapid City. Common.

Lecanora xanthophana, Nyl., var. *dealbata*, Tuckerm. Rocks. Rapid City. Often occurs with the species.

Lecanora glaucocarpa (Wahl.) Ach. Rocks. Rapid City. Common.

Lecanora fuscata (Schrad.) Th. Fr. Rocks. Custer City (Bessey); Rapid City Very common.

Rinodina oreina (Ach.) Mass. Rocks. Custer City (Bessey); Rapid City. A very common species.

Rinodina mamillana, Tuckerm. Rocks. Custer City (Bessey). A single specimen, evidently this Sandwich Island species.

Urceolaria scruposa (L.) Nyl. Earth and rocks. Rapid City. Exceedingly common.

Urceolaria scruposa (L.) Nyl. var. *gypsacea*, Nyl. Calcareous earth near Rapid City. It occurs in great abundance in the Bad Lands.

Urceolaria scruposa, var. *parasitica*, Sommerf. On thallus of various species of *Cladonia*. Rapid City, and also common in the Bad Lands.

Cladonia alcicornis (Lightf.) Flœrk. Sandy soils. Rapid City. Not uncommon.

Cladonia cariosa (Ach.) Spreng. Earth. Custer City (Rydberg); Rapid City. Abundant.

Cladonia pyxidata (L.) Fr. Earth, etc. Custer City (Bessey, Rydberg); Rapid City.

Cladonia pyxidata (L). Fr. var. *pocillum*, Ach. Earth. Rapid City. Not uncommon.

Cladonia fimbriata (L.) Fr. var. *tubæformis*, Fr. Earth and rotten logs. Rapid City. Common.

Cladonia gracilis (L.) Nyl. var. *verticillata*, Fr. Earth. Custer City (Rydberg); Rapid City. Not uncommon.

Cladonia macilenta (Ehrh.) Hoffm. Dead wood, etc. Rapid City.

Biatora Russellii, Tuckerman. Rocks and earth. Rapid City. Very plentiful.

Biatora decipiens (Ehrh.) Fr. Calcareous earth. Rapid City.

Biatora coarctata (Sw.) Tuckerm. Rocks. Custer City (Bessey); Rapid City.

Biatora hypnophila (Turn.) Tuckerm. Moss, etc. Rapid City.

Lecidea cæruleo-nigricans (Lightf.) Schær. Earth. Rapid City. Common.

Lecidea tessellata, Flœrk. Rocks. Custer City (Bessey); Rapid City. Common.

Lecidea polycarpa, Fr. Rocks. Rapid City.

Lecidea lapicida, Fr. Rocks. Rapid City (Bessey); Rapid City.

Lecidea enteroleuca, Fr. Trees and rocks. Custer City (Bessey); Rapid City, exceedingly common and variable.

Lecidea Morio, Schær. Rocks. Custer City (Bessey); Rapid City.

Buellia albo-atra (Hoffm.) Th. Fr., var. *saxicola*, Fr. What seems to be this variety on rocks. Rapid City. Rare.

Buellia parasema (Ach.) Th. Fr. Trees. Rapid City.

Buellia coracina (Hoffm.) Th. Fr. Rocks. Custer City (Bessey); Rapid City.

Buellia petræa (Flot.) Tuckerm., var. *Montagnæi* (Flot.) Tuckerm. Rocks. Custer City (Bessey); Rapid City. Common.

Buellia geographica (L.) Tuckerm. Rocks. Custer City (Bessey); Rapid City.

STATE AGRICULTURAL COLLEGE,
BROOKINGS, SOUTH DAKOTA.

Symbiosis in the Roots of the Ophioglossaceæ.*

By Geo. F. Atkinson.

While studying the structure of the root of *Botrychium Virginianum*, yellowish protoplasmic masses in certain cells of the cortical parenchyma, producing a strong contrast with the starch content of the other cells of the cortex, attracted my attention. Close examination and treatment with reagents showed the existence in the cortical parenchyma of the root of a symbiotic fungus stimulating the cells to the development of a rich protoplasmic content.

The organism is located at quite a definite portion of the cortical parenchyma, about one-third to one-half the distance from the epidermis to the central cylinder. In transections of the root it appears in the form of a ring entirely encircling the root, or only occupying an arc of a circle. From this localized center numerous threads extend to the epidermis and the outside of the root.

Since the roots of the Ophioglossaceæ do not possess root-hairs, or only a slight development of them, it occurred to me that possibly the presence of this symbiotic organism was universal in the roots of the order. Accordingly, several species, both of *Botrychium* and *Ophioglossum*, most of them in the Horace Mann herbarium of Cornell University, were examined. In all of them the presence of the fungus was determined.

The species examined, together with the localities, are here appended:

Botrychium matricariæfolium, *B. ternatum* and *B. Virginianum*, from New York.

B. lanceolatum, Massachusetts and Vermont.

B. subbifoliatum, Hawaiian Islands.

B. Lunaria, Clova Mountains.

Botrychium (No. 484, Drummond's Collection, Boston Soc. Nat. Hist.) Louisiana.

Ophioglossum vulgatum, New York and suburbs of Paris.

---

* Read before the Section of Botany, A. A. A. S., Madison Meeting, August, 1893.

O. Lusitanicum, Sardinia and Island of Madeira.
O. palmatum, Eastern Cuba.
O. pendulum, Oahu, Hawaiian Islands.

A note accompanies the latter to the effect that it was collected on trees, which is quite strong evidence of the probable necessity for the presence of this symbiont.

It thus appears that in the Ophioglossaceæ throughout the world, there exists a close symbiotic relationship with this organism, in all probability an accompaniment, or the cause of, the absence of root-hairs, which may have disappeared through lack of the necessity for such absorbent organs.

No specimens of *Helminthostachys* were at hand to examine, but I think we may confidently expect to find the organism in this genus also.

It may still be a question how much influence this symbiont has had on the symplicity of structure found in the Ophioglossaceæ, and what effect this would then have on the phylogenetic position of the order.

Botanical Department, Cornell University.

Photography as an Instrument for recording the macroscopic Characters of Micro-organisms in artificial Cultures.*

By Geo. F. Atkinson.

Many species of micro-organisms in artificial nutrient media present, in the growth of the colonies, characteristic peculiarities of form. These macroscopic appearances are frequently of great value when employed as differential characters. Some species, especially of fungi, when viewed by transmitted light, present important characters in the fine radiating threads and the general arrangement of the colony as a whole. The comparative density also of the colony is frequently quite constant.

A method of accurately recording these macroscopic characters would be a valuable aid in descriptions and comparative study.

---

* Read before the Section of Botany, A. A. A. S., Madison Meeting, August, 1893.

Where the growth is colorless, not very dense and peculiar for the fineness of its meshes or radiations, it would be difficult to photograph the colonies by ordinary methods of exposure, since there is little difference in color between the medium and the object.

A sensitive plate in an ordinary camera exposed to a plate culture by perpendicular rays of transmitted light shows little differentiation between the medium and colonies after development. The differentiation is also weak in the ground glass.

When, however, the perpendicular rays of light are cut off, and oblique rays from several directions are thrown through the plate culture upon the sensitive plate, the colonies are differentiated strongly in all their exquisite forms and tracings. The culture plates (Petrie dishes) or tubes, are inserted in an opening in the end of a box, which is painted perfectly black on the inside. Sliding boards, in a grooved frame, each cut to clamp over half the Petrie dish and lined with black velvety stuff hold the plate culture in position. The lens of the camera is pointed toward a window with the plate culture between. A perfectly black screen, 30 cm. to 40 cm. in diameter is then hung upon the window directly in front of the object in order to cut off the perpendicular rays of light.

BOTANICAL DEPARTMENT, CORNELL UNIVERSITY.

Crossing of Cucurbits.*

BY L. H. PAMMEL.

So widespread is the popular belief that several members of the genera *Cucurbita*, *Cucumis* and *Citrullus* will hybridize and "mix," that it is difficult to convince people of these errors. What is more surprising is that these opinions should find support among a certain class of popular scientists. It is scarcely necessary to repeat experiments of this kind, after the diligent work of Naudin, Bailey, Munson and others who have all demonstrated

*Read by title before the Section of Botany, A. A. A. S., Madison Meeting, August, 1893.

the absurdity of this popular error. In a paper read before the Association of Agricultural Colleges and Experiment Stations, the writer gave the result of a large number of careful hand pollinations made in 1892. These were to the effect that the different species do not "mix." Attention was called to the ease with which crosses could be obtained with nest-egg gourd and other varieties. All of the crosses obtained last year have been cultivated during the present season, and a short report on these may not be amiss.

It may be stated with positiveness that none of the seed of numerous varieties of *Cucurbita maxima* show any trace of *C. Pepo* or other cultivated genera. *Citrullus vulgaris* in numerous varieties show no trace of *Cucurbita Pepo, Cucumis Melo* and *C. sativus;* nor does *C. sativus* show any trace of *C. Melo* when pollinated by insects.

The different forms of *Cucurbita Pepo* intercross readily; not only was this shown in our hand pollination trials of last year, but our mixed seed has given us few specimens that are true to type.

A few illustrations will suffice.

Common Pumpkin on Long Warted produces a creeping vine less vigorous than Common Pumpkin, with leaf somewhat like the Long Warted. Fruit orange yellow, from four to six inches in diameter, smooth, without any indications of warts.

Vegetable Marrow on Long Warted: A long, slender running vine, something of the type of Vegetable Marrow; fruit golden yellow, or of cream color, elongated, two to four inches in diameter, all of them warted.

Common Pumpkin on Nest-egg Gourd: Leaf and vine of Nest-egg Gourd; color of fruit like Nest-egg Gourd, much elongated and larger than Nest-egg Gourd.

Common Pumpkin on Perfect Gem: Leaf and vine of Perfect Gem; color of fruit creamy yellow, but form and size approaching Pumpkin.

A mixed lot of seeds of Italian Striped show some of the leaf characters of Italian Striped; the stem is fleshy, as in the original, but it is a creeper, not bushy in its habit, as originally. The fruit is short, color orange yellow, and approaches Common Pumpkin.

Proceedings of the Botanical Club, A. A. A. S., Madison Meeting, August 18–22, 1893.

FRIDAY, AUGUST 18.

In the absence of the President, Prof. W. P. Wilson, the meeting was opened by the Vice-President, Prof. W. A. Kellerman.

In the absence of the Secretary, Prof. W. A. McBride, his office was filled by the election of Mr. W. T. Swingle.

The report of the Committee on Nomenclature, appointed at the Rochester meeting of 1892 to prepare a check-list of the flowering and fern plants of Northeastern North America, was made by Prof. N. L. Britton, Chairman. The list was presented nearly complete for printing. Discussion of the report occupied the remainder of the day's session. The report was received, and the following recommendations of the committee were adopted:

1. The amendment of Section III. of the Rochester Code of Nomenclature by striking out all after the word "retained."

This recommendation is based on the mature judgment of the committee, after watching for a year the progress of the demand for a rule which shall admit no exceptions whatever and effect the closest approximation to the immutability of the specific name.

This action authorizes the use of specific names identical with the generic, such as *Catalpa Catalpa*, and preserves the immutability of the specific name, in whatever genus it is first published, even if the same binomial has been published between the time of the first publication of the species and its transfer to the accepted genus, as for example:

SISYMBRIUM PINNATUM (Walt.) Greene, Bull. Cal. Acad. ii. 39 (1887).

Erysimum pinnatum, Walt. Fl. Car. 174 (1788).

Sisymbrium canescens, Nutt., Gen. ii. 68 (1818); not *Sisymbrium pinnatum*, Barn. in Gay. Fl. Chil. i. 125 (1845), which is to receive another name.

2. That the general sequence of natural orders as taken up in Engler and Prantl's "Natürliche Pflanzenfamilien" be adopted.

The check-list will therefore begin with the Pteridophyta, followed consecutively by the Gymnospermæ, Monocotylodonæ and Dicotylodonæ.

3. That in determining the name of a genus or species to which two or more names have been given by an author in the same volume or on the same page of a volume, precedence shall decide.

Tissa stands on the same page as *Buda* in Adanson's "Familles des Plantes," but has precedence of a few lines, and is to be adopted.

MONDAY, AUGUST 21.

The report of the Treasurer was received and accepted. It indicated a deficit of $6.16, which was made up by voluntary contributions. Prof. A. S. Hitchcock and Dr. Erwin F. Smith were appointed a committee to nominate officers for the next meeting of the Club.

Discussion of the remainder of the report by the committee on Nomenclature was postponed until Tuesday, and the matter was referred to the committee for reconsideration. It consisted of recommendations relative to the time and method of publication of the list and to the maintenance of the original name in case of plants first published as varieties but subsequently elevated to species, and of plants first published as species but subsequently reduced to varieties.

Mrs. Britton read a paper on "The Genus *Bruchia* in North America," illustrated by specimens and drawings. The paper will be published in a future issue of the BULLETIN.

Mrs. Britton remarked also on the necessity of the examination of types of critical species in the preparation of monographs or other works of reference. Prof. Greene alluded to the method of certification of types and duplicate types adopted by him, by the statement of the place of publication on the labels. Miss Harrison remarked on the identification of types in the National Herbarium.

Prof. Kellerman stated that the original drawings of the plates of Sullivant's "Icones Muscorum," together with many of the specimens used in executing these drawings, had recently been incorporated with the bryological collections of the Ohio State University.

Prof. A. S. Hitchcock exhibited specimens of the recently-described *Ampelopsis quinquefolia*, var. *vitacea*, Knerr., and re-

marked on the relationship of the plant to the Virginia Creeper. He demonstrated the differences of leaves, tendrils, inflorescences and canes, remarked on the differences in time of blooming, and maintained that they are specifically distinct.

Prof. J. C. Arthur exhibited and described a new centrifugal machine for physiological investigations.

A paper by Mr. D. T. MacDougal, on "The Intertwining of Tendrils," was read by Dr. J. C. Arthur. The plant most studied in this investigation was *Micrampelis lobata*.

Mrs. Britton described the Jæger Moss Herbarium recently acquired by Columbia College. An account of this collection is published in the last number of the BULLETIN.

Prof. Kellerman alluded to the Ohio State Forestry exhibit at Chicago, and stated that *Ilex opaca*, hitherto not certainly known from that State, had been found by him on Sim's Creek, Lawrence county, near the Ohio River; he doubted the occurrence of *Magnolia tripetala* in the State, although it had been reported, and remarked that all the localities given for *Chamæcyparis thyoides* had yielded only *Thuja occidentalis*. *Polypodium polypodioides* had been found on rocks in Scioto county.

Prof. A. S. Hitchcock described the pollination of *Œnothera Missouriensis*. This plant was in flower in the vicinity of Manhattan, Kansas, between May 23d and June 6th. The flower opens in the latter part of the afternoon, but the stigmas may protrude from the bud as early as 2 p. m. The calyx tube is narrow and about 11 centimeters long, and is as much as half filled with nectar. Just before 8 p. m. the flowers were abundantly visited by a sphinx-moth (*Deilephila lineata*). An individual would support itself above the expanded flower, insert its proboscis, which usually measures about 45 mm., and push its head as far into the throat as possible. Excepting ants, no other insects were observed to visit the flowers, and the visits of the moths ceased at dark. Only the uppermost portion of the nectar is obtained by the insect, but the latter is detained in the flower by its endeavor to secure more. It would seem that the flower was adapted to a moth with a longer proboscis, but none are known to occur in the vicinity except the potato moth.

Prof. Hitchcock also described the pollination of *Pentstemon Cobæa*.

Dr. Erwin F. Smith called attention to the fact that a tumor, not due to nematodes, was becoming increasingly prevalent in the United States on the roots of peaches, almonds and other stone fruits. These tumors vary in size from that of a pea to a man's fist. Nursery stock is especially subject to attack, and the roots of a small tree may often bear half a dozen, nearly the whole energy of the plant being used up by these abnormal growths. The disease occurs from New Jersey to Georgia and west through Michigan and Missouri to Arizona and California. It is now most prevalent on the Pacific Coast, where its depredations are serious and increasing every year. A microscopic examination of the inner tissues of fresh young tumors has not shown the presence of animal or vegetable parasites, and their cause is still a mystery. The most suggestive hypothesis is that they may be caused by external irritation, *i. e.*, to some parasite acting from without. It is a subject becoming economically more and more important, and will soon demand critical study by some plant pathologist.

Prof. D. H. Campbell remarked on a preliminary study of the prothallium in Ophioglossaceæ, and exhibited this organ in *Botrychium Virginianum.*

Prof. Bessey read a paper on "The Use of Personal Names in Designating Species." He strongly condemned the practice. Prof. Britton called attention to the propriety of the use of personal adjectives in genera of a very large number of species, where all the available descriptive adjectives have been exhausted, and also of the valuable historical feature in the association of the first collector's name with a species. Dr. A. B. Seymour approved the position taken by Dr. Bessey. Prof. Coulter favored the use of personal names for the reasons advanced by Dr. Britton and on the ground that they were conducive to stability.

Tuesday, August 22.

Prof. J. C. Arthur exhibited and described a new form of registering auxanometer.

Mr. W. T. Swingle read a paper on "The Southernmost Botanical Laboratory of the United States." He described the Subtropical Laboratory of the Division of Vegetable Pathology, United States Department of Agriculture, established at Eustis,

Florida. The building has been erected by the citizens of Eustis, is 46 feet long and 34 feet wide and contains six rooms, one of them a visitor's laboratory, which is provided for the use of students not connected with the institution. There is also an experimental garden of one and one-half acres. The Library consists of about 1,000 volumes and 1,000 pamphlets, and all the more important botanical serials are received.

Mr. Swingle also exhibited and described a new Florida palm, related to *Sabal Palmetto* and known as the Etonia palm. He called especial attention to the fact that Florida still contains a large number of new or imperfectly known species of plants.

Prof. Byron D. Halsted described a new species of *Exobasidium*, *E. Peckii*, occurring on *Andromeda Mariana* and causing the enlargement and modification of its flowers. He also showed specimens of *Rhamphospora Nymphææ*, an Indian fungus now found on water-lily leaves in America, of a *Phyllosticta* following insect depredations and an Ascomycete on *Pistia stratiotes*.

Mrs. Britton remarked on some of the more interesting mosses collected on Saturday's trip to the dells of the Wisconsin River.

Mr. A. B. Seymour read a paper on "The Synonymy of *Valsa stellulata* and its Synonymical Allies."

He also exhibited copies of a dichotomous key to the lichen genus *Cladonia*, arranged by Dr. F. Le Roy Sargent.

A paper by Mr. S. A. Beach, "Some Observations on Black Knot," was read by Dr. B. D. Halsted and discussed by Prof. W. H. Brewer and Prof. H. L. Bolley. The infection was noticed as much worse adjoining a row of old and badly infested plum trees. Proof was also adduced that infection must have taken place a year previous to the appearance of the disease.

The following papers were read by title:

"Sand Dune Weeds," by L. H. Bailey.

"Propagation of *Ranunculus delphinifolius* by Runners," by W. W. Rowlee.

"Some Notes on the Germination of the Spores of *Enteridium Rozeanum*," by Elias J. Durand.

"Herbarium Entomology," by C. V. Riley.

"*Yucca* Pollination," by C. V. Riley.

"Notes on a hexenbesen of *Rubus*," by B. T. Galloway.

"The Falling of Pine Leaves," by B. T. Galloway.

"Some Methods employed in the Investigation of parasitic Fungi and other Organisms," by B. T. Galloway.

The committee appointed at the Rochester meeting to consider and report on the advisability of forming a national botanical society presented a majority report disapproving the formation of such an organization at the present time, and Prof. C. R. Barnes presented a minority report recommending its immediate establishment by the selection by the Club of a committee of ten who shall select fifteen others, these twenty-five to be the charter members of the society. The minority report was accepted, and a committee of ten selected by ballot.

The Committee on Nomenclature was authorized to proceed with the publication of the check-list, matters concerning it not determined by the Club were referred to the committee with power, and the committee increased to nine members by the appointment of Professors Edward L. Greene and Wm. Trelease.

Officers for the next meeting were elected as follows: President, Prof. Douglas H. Campbell; Vice President, Prof. Daniel C. Eaton; Secretary and Treasurer, Mr. W. T. Swingle.

N. L. Britton.

Titles of Papers read before the Section of Botany, A. A. A. S., Madison Meeting, August, 1893.

Photography as an Instrument for recording the microscopic Characters of Micro-organisms in artificial Cultures, by G. F. Atkinson.

Symbiosis in the Roots of Ophioglossaceæ, by G. F. Atkinson.

Observations on a Rust affecting the Leaves of the Jersey or Scrub Pine, by B. T. Galloway.

Prophylla of Gramineæ, by W. J. Beal.

A new injection Needle for the Study of the Lower Plants, by J. Christian Bay.

On the Food of Green Plants, by Charles R. Barnes.

Results of some recent Work on Rust of Wheat, by B. T. Galloway.

Comparative Study of the Structure and Junction of the Sporangia of Ferns in the Dispersion of Spores, by G. F. Atkinson.

The Solandi Printing applied to Botanical Work, by Byron D. Halsted.

Present Aspects of the Nomenclature Question, by N. L. Britton.

Lichens of the Black Hills, by T. A. Williams.

The Bibliography of American Botanical Literature, by J. Christian Bay.

Notes on the Development of *Marattia Douglassii*, by Douglas H. Campbell.

The fructification of *Juniperus*, by John G. Jack.

The Roots of Orchids, by M. B. Thomas.

Preliminary Notes on some Chromogenic Bacteria of the Ames Flora, by L. H. Pammel.

Further Observations on the Fermentation Tube with special Reference to Anærobiosis, Reduction and Gas Production, by Theobald Smith.

Two new and destructive Diseases of Cucurbits, by Erwin F. Smith.

Preliminary Statement concerning Botanical Laboratories and Instruction in American Universities and Colleges, by Conway MacMillan.

On the Quantitative Analysis of the Colors of Flowers and Foliage, by J. H. Pillsbury.

The minute Structure and Development of the Motile Organ in the Leaf of the Red-bud, by S. G. Wright.

The Shrinkage of Leaves in drying, by Byron D. Halsted.

Distribution of the Gramineæ in the United States, by S. M. Tracy.

A Consideration of Species based on the Theory of Evolution, by N. L. Britton.

A Revision of the Genus *Physcomitrium*, by Elizabeth G. Britton.

Deviation in Development due to the use of Unripe Seeds, by J. C. Arthur.

The principal Diseases of *Citrus* Fruits now being studied at Eustis, Fla., by W. T. Swingle.

Cephaluros mycoidea and *Phyllosiphon* sp., two Parasitic Algæ, new to North America, by W. T. Swingle.

An Analysis of the Conditions affecting the Distribution of Plants, by Frederick V. Coville.

A Sclerotium Disease of Plants, by P. H. Rolfs.

Notes on *Ræstelia pyrata*, by L. H. Pammel.

Crossing of Cucurbits, by L. H. Pammel.

A case of poisoning by the Wild Parsnip, *Cicuta maculata*, by L. H. Pammel.

Ulota Americana, Mitten, and *Orthotrichum Americanum*, Beauv., by Elizabeth G. Britton.

Palæobotanical Papers read before the Section of Geology and Geography, A. A. A. S., Madison, Wisconsin, 1893.

PAPERS BY JOS. F. JAMES.

"*Remarks on the Genus Arthrophycus.*"—Attention is called to the fact that this organism was originally described by Harlan in 1831, under the name *Fucoides Alleghaniensis*. In 1838 Conrad changed it to *Fucoides Harlani*, and when, in 1852, Hall changed the generic name to *Arthrophycus*, the specific name given by Conrad was retained, and this is the one under which it has been generally known. In accordance with the rules of priority, it should appear as *Arthrophycus Alleghaniensis* (Harlan).

"*Studies in Problematic Organisms; the Genus Fucoides.*"—A revision of the classifications under which various problematic organisms have been placed in the attempt to differentiate them or to identify them with living algæ genera. The author outlines a new scheme of classification based upon recent researches, which have proved many of the so-called algæ to be inorganic markings, tracks of animals, etc., and have also added to the more exact determination of the affinities of many which are true algæ.

"*The Value of Pseudo-algæ as Geological Guides.*"—The author concludes that, inasmuch as the evidence of the organic nature of many of the so-called fossil algæ is defective, any deductions based upon the presence of many described species are valueless and misleading, and that they are not safe geologic guides.

PAPERS BY ARTHUR HOLLICK.

"*Recent Discoveries in the Cretaceous Formation on Long Island.*"—The author notes the discovery, during the past summer, of cretaceous plants on the north shore of Long Island, at localities not previously reported, thus extending the known range of the cretaceous strata on the islands.

"*Some Results obtained in Recent Examinations of the Yellow Gravel Formation in New Jersey and Northeastward.*"—In this communication reference is made to the discovery of fossil leaves in the incoherent yellow gravel sandstone at Atlantic Highlands, N. J. The specimens, although fragmentary, are apparently similar to those previously found in the same formation at Bridgeton, N. J.

ARTHUR HOLLICK.

Proceedings of the Madison Botanical Congress.

During the summer of 1893 a committee of American botanists was appointed by Prof. C. E. Bessey, Chairman of the Section of Botany, American Association for the Advancement of Science, and Prof. W. P. Wilson, President of the Botanical Club associated with the same institution, to arrange for a Botanical Congress, to be held at Madison, Wisconsin. The call of this committee for such a congress will be found on page 298 of the present volume of the BULLETIN.

The Congress met in Science Hall, University of Wisconsin, Madison, at 10 a. m., Wednesday morning, August 23, 1893, and was called to order by Prof. J. C. Arthur, Chairman of the committee.

The following resolution, offered by Prof. C. E. Bessey, was unanimously adopted:

Resolved, That inasmuch as the attendance of European botanists at this meeting has fallen much below the expectation of the organizing committee, so that the desired international character of the assemblage has not been realized, the name of this body be the "Madison Botanical Congress."

A committee, consisting of Prof. N. L. Britton, Prof. C. E. Bessey, Mr. J. J. Davis, Prof. S. M. Tracy and Prof. Conway Macmillan, was appointed to nominate officers for the Congress.

On the report of this committee, the Congress was officered as follows:

President—Edw. L. Greene.

Vice-Presidents. { Henri L. de Vilmorin. / Lucien M. Underwood.

Secretaries. { J. C. Arthur. / F. V. Coville. / B. L. Robinson.

Treasurer—C. R. Barnes.

M. de Vilmorin presided over the first session of the Congress.

Communications were received from Professors Ascherson and Engler, of the International Committee on Botanical Nomenclature, appointed at the congress held last August at Genoa, Italy, and from Dr. Otto Kuntze. They were referred to the American members of the International Committee, Profs. N. L. Britton, John M. Coulter and Edw. L. Greene.

Topics for consideration by the Congress were suggested by the organizing committee, and the following were selected and referred to committees for preparation before presentation:

1. The Nomenclature of Plant Diseases.

Committee. { Byron D. Halsted, Chairman. / W. T. Swingle. / L. R. Jones.

2. The Terminology of Anatomy and Morphology.

Committee. { Douglas H. Campbell, Chairman. / Conway MacMillan. / C. R. Barnes.

3. The Terminology of Physiology.

Committee. { J. C. Arthur, Chairman. / W. T. Swingle. / A. S. Hitchcock.

4. The Nomenclature of Horticultural Forms.

Committee. { Wm. Trelease, Chairman. / Henri L. de Vilmorin. / B. L. Robinson.

5. Bibliography and Typography.

Committee. { C. R. Barnes, Chairman. / A. B. Seymour. / N. L. Britton.

A committee consisting of M. de Vilmorin and Mr. Coville were appointed to draft suitable resolutions regarding the death of M.

Alphonse DeCandolle, and one consisting of Professors Coulter and Britton, to draft similar resolutions relative to the death of Dr. Geo. Vasey.

The Congress convened again on the following morning, the President in the chair.

Professor L. M. Underwood suggested as an additional topic for discussion: 6. The Terminology of Plant Geography. The suggestion was adopted, and the following committee appointed to prepare for its presentation: Mr. F. V. Coville, chairman; Mr. W. T. Swingle, Prof. L. M. Underwood.

In the absence of Prof. Coulter, Prof. Bessey was appointed to serve on the committee to submit resolutions relative to the death of Dr. Geo. Vasey.

Prof. W. A. Kellerman, Miss Susan Hallowell and Dr. B. L. Robinson were appointed a committee on resolutions.

The committee appointed to submit resolutions regarding the death of M. Alphonse DeCandolle reported as follows:

In response to a common sentiment the members of the Madison Botanical Congress desire to express their sorrow at the death of Alphonse De Candolle, and at the same time their profound admiration for the greatness of his life and his work.

To him we have looked up as the patriarch, in our times, of systematic botany; and from him we have received not alone the example and incentive for the highest standard of scientific work, but the greater lessons of magnanimity, dignity and simple truth.

We feel deeply the loss of such a friend, notwithstanding the ripeness of his age and the completeness of his work.

HENRI L. DE VILMORIN,
F. V. COVILLE,
Committee.

The report was accepted, ordered engrossed, signed by officers of the Congress and transmitted to the family of the deceased.

Prof. Halsted presented the report of the committee on the Nomenclature of Plant Diseases. This and the other reports together with their discussion will be published in the official proceedings of the Congress. After much discussion the report was referred to a standing committee of seven, consisting of the three members presenting the report and Professors Bessey, Kellerman, Atkinson and Mr. Galloway; the committee was requested to report at the next meeting of the Section of Botany, A. A. A. S.

The report of the committee on the Terminology of Plant Physiology was presented by Prof. Arthur. After full discussion, it was referred to a committee of five, consisting of the three members presenting the report and Professors Barnes and MacMillan; the committee was requested to report at the next meeting of the Section of Botany, A. A. A. S.

The report of the committee on the Terminology of Anatomy and Morphology was presented by Prof. MacMillan. A committee of five, formed by the addition of Prof. Farlow and Mr. Roland Thaxter to the three members making the report, was appointed to further elaborate the subject and report it as in the two preceding cases.

Prof. Trelease presented the report of the committee on the Nomenclature of Horticultural Forms, recommending that for the present the nomenclature of Nicholson's Dictionary of Gardening and the Index Kewensis be followed.

Professor Barnes reported for the committee on Bibliography and Typography, submitting a typographical scheme for the citation of authors, which was adopted, and recommendations for securing a complete bibliography of literature relating to American botany, and the production of uniform card indexes to species, plates and papers, which were referred to a committee of five with power to consider and approve means of publication. This committee consists of Prof. Barnes, Mr. Seymour, Prof. Britton, Mrs. Alice F. Stevens and Prof. A. S. Hitchcock. This committee subsequently met and recommended the continuation of the Index to Recent Literature relating to American Botany published in the BULLETIN, with some modification of its present arrangement and typography, and approved the issue of card indexes to American species and illustrations of American plants as submitted by Mrs. Stevens and Miss Clark of the United States Department of Agriculture.

Professors Bessey, Britton and Kellerman were appointed a committee to memorialize the United States Congress and the Secretary of Agriculture to provide safe and commodious quarters for the National Herbarium.

The committee appointed to prepare resolutions relative to the death of Dr. Geo. Vasey, reported as follows:

The death of Dr. Geo. Vasey, Botanist of the United States Department of Agriculture, which occurred on March 4th, 1893, has called from us one of America's most widely known scientists. Dr. Vasey occupied for more than twenty years the most prominent botanical position in the gift of our national government, and administered the duties of his office in a most effective and enlightened manner. It is due to his continued exertions that our National Herbarium has attained its present rank as one of the chief centres of botanical research. His extensive contributions to the literature of the Gramineæ have made his name familiar to botanists of all countries. Be it therefore

Resolved, That the Madison Botanical Congress realizes that in the death of Dr. Vasey botanical science has suffered a most serious loss; and

Resolved, That this preamble and resolutions be entered on the minutes of the Congress, and that a copy be engrossed, signed by the officers of the Congress, and transmitted to the family of the deceased.

CHARLES E. BESSEY,
N. L. BRITTON,
Committee.

Mr. Coville presented the report of the committee on the Terminology of Geographical Botany. The report was accepted and the committee requested to continue the consideration of the subject and submit it at the next meeting of the Section of Botany, A. A. A. S.

It was resolved that the secretaries of the Congress be authorized to publish and distribute the proceedings, and that the expense of such publication not met by funds available to the Organizing Committee be assessed on the members of the Congress.

The committee on memorializing the government relative to the National Herbarium reported as follows:

Whereas, The National Herbarium, with all its wealth of specimens of inestimable value, is at present deposited in a building which from its construction and use is peculiarly liable to destruction by fire; and

Whereas, Such destruction would be an irreparable loss to the science of botany. Therefore, be it

Resolved, That we, the members of the Madison Botanical Congress, hereby appeal to the Senators and Representatives of the National Congress to make early provision for a suitable fireproof building for the preservation of this scientific treasure, and

we would respectfully request the Secretary of Agriculture to urge upon Congress the desirability of prompt action in this matter.

CHARLES E. BESSEY,
N. L. BRITTON,
W. A. KELLERMAN,
Committee.

Resolutions tendering the cordial thanks of the Congress to Prof. Chas. R. Barnes and other members of the local committee of arrangements for their arduous labors in behalf of the comfort and entertainment of the members, and to Dr. Otto Kuntze of Friedenau, Germany, for a supply of his pamphlets containing proposed amendments to the Paris Code of Nomenclature, were reported by the Committee on Resolutions and unanimously adopted.

The Congress then adjourned.

N. L. BRITTON.

Organization of a Society of American Botanists.

At the meeting of the Botanical Club of the American Association for the Advancement of Science, held at Madison, Wisconsin, August 23, 1893, a committee of ten botanists was selected by ballot to choose fifteen others, these twenty-five to be charter members of a new botanical society. The committee met the following morning and performed the duty assigned, the charter members thus chosen being as follows: J. C. Arthur, G. F. Atkinson, L. H. Bailey, C. R. Barnes, C. E. Bessey, E. G. Britton, N. L. Britton, D. H. Campbell, J. M. Coulter, F. V. Coville, Daniel C. Eaton, W. G. Farlow, E. L. Greene, B. D. Halsted, Arthur Hollick, Conway MacMillan, B. L. Robinson, C. S. Sargent, F. L. Scribner, J. Donnell Smith, Roland Thaxter, Wm. Trelease, L. M. Underwood, Lester F. Ward, W. P. Wilson.

Two informal meetings of those of the above list in attendance on the Madison Botanical Congress were subsequently held, and a committee of organization appointed consisting of Prof. Wm. Trelease, Chairman; Prof. J. M. Coulter, Prof. Conway MacMillan, Prof. L. H. Bailey and Prof. C. S. Sargent.

This committee was instructed to inform the others of the twenty-five charter members of the action taken, to draw up a constitution and to report at a meeting to be held beginning on the Monday preceding the next meeting of the American Association for the Advancement of Science, and at the same place selected for the meeting of that association. Numerous topics were discussed at these informal meetings, among them the name of the new organization for which the terms American Botanical Society, Botanical Society of America and Society of American Botanists were proposed; the standard of membership to be maintained; the question of one or more classes of members; the fees for membership and initiation; the work of the organization, including publication, the number of annual meetings and the encouragement of research. No formal action on any point was taken, but the opinions of those present were obtained and ordered referred to the chairman of the committee of organization.

Botanical Notes.

Aralia nudicaulis, L., var. *elongata*, n. var.—Leaves longer and narrower than the type (5–6 in. long, by 1½ in. wide) gradually tapering to a point, rounded at base, coarsely and irregularly serrate, decidedly paler beneath.

I collected this on July 11 in the Catskill Mountains, on the top of Cairo Round Top, Greene county, at an elevation of about 2,000 feet. It was growing in a rocky woods with the type. I saw several sterile plants, but collected only one in fruit. While the fruit on a specimen of the type, collected within a few feet of this, was perfectly green, the fruit of the variety was entirely ripe. I did not have an opportunity to verify this, however.

The leaves seem to be 3-foliolate, with a tendency in the terminal leaflet to divide to the base, giving the leaf a very odd and characteristic appearance. GEO. V. NASH.

CLIFTON, N. J., Sept. 6, 1893.

Carex arctata, Boott., var. *Faxoni*, Bailey.

A single specimen of this rare sedge was collected by me at Grayling, Mich., in 1889. It had not been previously found in the lower peninsula of this State, and so far as I know, has been

reported only from Isle Royale and Keweenaw county, Mich., the extreme northern part of Minnesota, Canada, and Lisbon, N. H. The last-named locality is in about the same latitude as Grayling, and these are the most Southern stations. G. H. HICKS.

AGRICULTURAL COLLEGE, MICH., Aug. 2, 1893.

Index to Recent Literature Relating to American Botany.

Acanthorhiza aculeata. (Bot. Mag. t. 7302).

Description and illustration of this Mexican palm.

Adiantum pedatum (Meehan's Month. iii. 113, with colored illustration).

Anthurium Chamberlaini. J. D. Hooker (Bot. Mag. t. 7297).

A superb Aroid, presumably native of Venezuela.

Asplenium septentrionale—A new Station for. D. C. Eaton (Zoë, iv. 185).

Record of the occurrence of this fern in Lower California.

Botanical Nomenclature. Katharine Brandegee (Zoë, iv. 182–184).

Botanical Notes from Texas. E. N. Plank (Gard. and For. vi. 332).

Notes on the rare *Berberis Swaseyi*, Buckley, and a short biography of Jacob Ferdinand Lindheimer.

Botany and Forestry. W. J. Beal (Annual Rep. Sec. State Board Agric., State of Michigan, xxxi. reprint, 1893).

A short history of the Botanical Department and report of the exercises of the laying of the corner-stone of the Botanical Laboratory.

Brasilianischen Nutz-und Heilpflanzen—Die. Theodor Peckolt (Pharm. Runds. xi. 181).

Discusses principally species of the genus *Aristolochia.*

Caladium venosum. N. E. Brown (Gardn. Chron. xiv. 86). Description of two new species from Brazil.

California Yellow Bells. C. R. Orcutt (West. Am. Scientist, viii. 38).

With figure of *Emmenanthe penduliferá.*

Cell-union in herbaceous Grafting. John S. Wright (Bot. Gaz. xviii. 285–293; two plates; reprinted).

Collinsia—A new. S. B. Parish (Zoë, iv. 147).

Description of *C. Davidsonii* from the Mojave Desert.

Crotalaria longirostrata. J. D. Hooker (Bot. Mag. t. 7306).

Native of Mexico.

Dipladenia eximia. W. Botting Hemsley (Gardn. Chron. xiv. 120). A newly described species from South America.

Draparnaldia—Observations on the Zoospores of. L. N. Johnson (Bot. Gaz. xviii. 294–298; one plate).

Evaporation of Water from Plants—Some Recent Investigations on the. Albert F. Woods (Bot. Gaz. xviii. 304–310).

Field Notes at San Emidio. Alice Eastwood (Zoë, iv. 144–147).

Flora of Guadalupe Island—Notes on the. F. Franceschi (Zoë, iv. 130–139).

Notes on 60 species and varieties.

Flora of Ohio—New Plants for the. Wm. C. Werner (Ohio Agric. Exp. Sta., Tech. Series, Bull. No. 3; extract).

Notes on 49 species, hitherto unrecorded from the State, among them *Aconitum Noveboracense, Cardamine arenicola, Elodes petiolata* and *Opuntia Rafinesquii.*

Flora of Southern California—Additions to the. S. B. Parish (Zoë, ix. 160–167).

Record of new localities for a large number of species.

Forestry for 1892—Report of the Chief of the Division of. B. E. Fernow (U. S. Depart. Agric. 1893, illustrated).

Fungi of Wisconsin.—A Supplementary List of Parasitic. J. J. Davis (Trans. Wisc. Acad, ix. 153–188; reprint).

Notes on 495 species, supplementary to Prof. Trelease's list of 1882.

Habenaria—The Genus. H. S. Pepoon (Asa Gray Bulletin, No. 2, pp. 8, 9).

Hepaticarum species novæ—II. F. Stephani (Hedwigia, xxxii. 137–147).

Anastrophyllum ciliatum, from Staten Island, Patagonia; *Anthoceros Dussii* from Martinique; *Anthoceros planus* from Brazil; and *Balantiopsis Chilensis* from Chile are described as new.

Hickory—Our Shellbark. J. T. Rothrock (Forest Leaves iv. 56; illustrated).

Iris Caroliniana (Gard. and For. vi. 334, with figure).

Lichenes exotici, II. J. Müller (Hedwigia, xxxii. 120–136).

Thalloidima Spruceanum and *Pertusaria lævigata*, from Brazil; *Patellaria Magellanica*, from Southern South America; *Parathelium megalosporum*, *Pleurotrema Burchellii*, *Tomasellia nigrescens*, *Polyblastia cæsiella*, from Brazil; and *Pyrenula Cocoes*, from Barbadoes, are described as new.

Marine Diatoms in Fresh Water—The Occurrence of. A. M. Edwards (Journ. N. Y. Micros. Soc. ix. 71–72).

New Localities for California Plants. T. S. Brandegee (Zoë, iv. 148–160).

Notes on a large number of species. *Claytonia saxosa*, *Chorizanthe Vortriedei* and *Chlorogalum purpureum* are described as new.

New or Noteworthy North American Plants. John M. Coulter and E. M. Fisher (Bot. Gaz. xviii. 299–303).

New species and varieties are proposed in the genera *Petalostemon*, *Astragalus*, *Hedysarum*, *Aster*, *Mimulus*, *Pentstemon* and *Plantago*.

Note on Nomenclature. Georg. B. Sudworth (Gard. and For. vi. 324).

Since the publication of the author's notes on *Bladhia paniculata* (Nutt.) *Ardisia Pickeringia*, Nutt.) it has been found that the genus *Icacorea*, Aublet, antedates the genus *Bladhia* by nine years. In consequence of this *Bladhia paniculata* becomes *Icacorea paniculata*.

Notes from the Gull Lake Biological Station of the University of Minnesota. Conway MacMillan (Bot. Gaz. xviii. 315, 316).

Record of the occurrence of root-hairs in *Elodea Canadensis*, and of the excessive luxuriance of *Equisetum limosum* at Upper Cullen Lake.

Notes on the Distribution of Trees and Shrubs in the Deserts and Desert Ranges of Southern California, Southern Nevada, Northwestern Arizona and Southern Utah.—Notes on the geographic and vertical Distribution of Cactuses, Yuccas and Agave of the same Territory. C. Hart Merriam (North American Fauna, No. 7, pp. 285–343, 345–359; reprint).

An important contribution to the geographical botany of the region, preliminary to Mr. Coville's report on the Botany of the Death Valley Expedition, now in press.

Ohio Plants—Notes on Distribution of and Stations for a few rare and interesting. Wm. C. Werner (Ohio Agric. Exp. Sta. Tech. Series, Bull. No. 3; extract).

Notes on 17 species.

Pepperidge Tree—The. O. C. Simonds (Am. Gardening, xiv. 469).

With illustration of *Nyssa aquatica*.

Phænogams—The Leader of the. James A. Graves (Asa Gray Bulletin, No. 2, 2–5).

Notes on Ranunculaceæ observed about Susquehanna, Pennsylvania, and an explanation of the position of this order at the beginning of the botanical sequence of De Candolle.

Pilze aus dem konigl. Botanischen Museum in Berlin.—Einige neue. P. Hennings (Hedwigia, xxxii. 61–64).

Puccinia xylariiformis, from Chile, is described as new.

Pilze Chiles, soweit dieselben als Nahrungsmittel gebraucht werden. F. Philippi (Hedwigia, xxxii. 115–118).

Plants Collected in Southeastern Utah, with Notes and Descriptions of New Species—List of. Alice Eastwood (Zoë, iv. 113–127; two plates).

Notes on 141 species, *Cæsalpinia repens*, *Asclepias involucrata*, var. *tomentosa*, *Gilia Triodon*, *G. superba*, *Phacelia nudicaulis* and *Pentstemon Utahensis* being described as new.

Primitiæ Floræ Costaricensis—II. T. Durand and H. Pittier (Bull. Soc. Bot. Belg. xxxi. 119–216).

Continuation of the narrative of the botanical exploration of Costa Rica, supplemented by the enumeration of the Mosses collected by M. Pittier, contributed by M. M. Renauld and Cardot, new species being described in the genera *Dicranella*, *Dicranum*, *Campylopus*, *Holomitrium*, *Fissidens*, *Leptodontium*, *Hyophila*, *Barbula*, *Macromitrium*, *Philonotis*, *Breutelia* (*B. Brittoniæ*, the same as Dr. Rusby's 3,137 from Bolivia), *Acidodontium*, *Brachymenium*, *Bryum*, *Atrichum* and *Pogonatum;* the enumeration of the Hepaticæ by F. Stephani, new species being described in the genera *Aneura*, *Anthoceros*, *Chiloscyphus*, *Frullania*, *Herberta* and *Plagiochila*, and of the Compositæ by F. Klatt, where new species are described in *Piptocarpha*, *Eupatorium*, *Mikania*, *Gymnolomia*, *Montanoa*, *Aspilia*, *Zexmenia*, *Viguiera*, *Calea*, *Liabum*, *Schistocarpha* and *Senecio*.

Contributions from the Herbarium of Columbia College.

No. 1. A Preliminary List of North American Species of *Cyperus*, with Descriptions of New Forms. By N. L. Britton (1886), ... 25 cents.

No. 2. *Cerastium arvense*, L., and its North American Varieties. By Arthur Hollick and N. L. Britton (1887). (Out of print.)

No. 3. Plant Notes from Temiscouata County, Canada. By J. I. Northrop (1887). (Out of print.)

No. 4. A List of Plants Collected by Miss Mary B. Croft at San Diego, Texas. By N. L. Britton and H. H. Rusby (1887), ... 25 cents.

No. 5. New or Noteworthy North American Phanerogams. By N. L. Britton (1888), ... 25 cents.

No. 6. An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1886–1887. By N. L. Britton. (Twenty-three parts published; not yet completed.)

No. 7. The Genus *Hicoria* of Rafinesque. By N. L. Britton (1888), . . . 25 cents.

No. 8. A Recent Discovery of Hybrid Oaks on Staten Island. By Arthur Hollick. (1888), ... 25 cents.

No 9. A List of Plants Collected by Dr. E. A. Mearns at Fort Verde and in the Mogollon and San Francisco Mountains, Arizona, 1884–1888. By N. L. Britton.

The General Floral Characters of the San Francisco and Mogollon Mountains and the Adjacent Region. By H. H. Rusby (1888), ... 25 cents.

No. 10. Contributions to American Bryology—An Enumeration of the Mosses Collected by Mr. John B. Leiberg in Kootenai County, Idaho. By Elizabeth G. Britton. (Out of print.)

No. 11. Preliminary Notes on the North American Species of the Genus *Tissa*, Adans. By N. L. Britton (1889), ... 25 cents.

No. 12. The Genus *Eleocharis* in North America. By N. L. Britton (1889), 25 cents.

No. 13. New or Noteworthy North American Phanerogams, II. By N. L. Britton (1889), ... 25 cents.

No. 14. A List of State and Local Floras of the United States and British America. By N. L. Britton (1890), ... $1.

No. 15. A Descriptive List of Species of the Genus *Heuchera*. By Wm. E. Wheelock (1890), ... 25 cents.

No. 16. New or Noteworthy North American Phanerogams, III. By N. L. Britton (1890), ... 25 cents.

No. 17. The Flora of the Desert of Atacama. By Thos. Morong (1891), 25 cents.

No. 18. Contributions to American Bryology, II. A supplementary Enumeration of Mosses collected by Mr. John B. Leiberg in Kootenai County, Idaho. By Elizabeth G. Britton (1891), ... 25 cents.

No. 19. Notes on North American Haloragæ. By Thos. Morong (1891), . 25 cents.

No. 20. New or Noteworthy North American Phanerogams, IV. By N. L. Britton. (1891), ... 25 cents.

No. 21. Notes on the North American Species of Eriocauleæ. By Thos. Morong (1891), ... 25 cents.

No. 22. New or Noteworthy North American Phanerogams, V. By N. L. Britton (1891), ... 25 cents.

No. 23. The American Species of the Genus *Anemone* and the Genera which have been referred to it. By N. L. Britton (1891), ... 25 cents.

No. 24. Review of the North American Species of the Genus *Xyris*. By Heinrich Ries (1892), ... 25 cents.

No. 25. A Preliminary List of the Species of the Genus *Meibomia* occurring in the United States and British America. By Anna M. Vail (1892), . 25 cents.

No. 26. A List of Species of the Genera *Scirpus* and *Rynchospora* occurring in North America. By N. L. Britton (1892), ... 25 cents.

No. 27. Note on a Collection of Tertiary Fossil Plants from Potosi, Bolivia. By N. L. Britton (1892), ... 25 cents.

No. 28. The Anatomy of the Stem of *Wistaria Sinensis*. By Carlton C. Curtiss (1892), ... 25 cents.

No. 29. New or Noteworthy North American Phanerogams, VI. By N. L. Britton (1892), ... 25 cents.

No. 30. *Ranunculus repens* and its Eastern North American Allies. By N. L. Britton (1892), ... 25 cents.

No. 31. A Preliminary List of American Species of *Polygonum*. By John K. Small. (1892), ... 25 cents.

No. 32. West Virginia Mosses. By Elizabeth G. Britton (1892), ... 25 cents.

No. 33. A New Species of *Listera*, with Notes on Other Orchids. By Thos. Morong. (1893), ... 25 cents.

No. 34. The North American Species of *Lespedeza*. By N. L. Britton (1893) 25 cents.

No. 35. An Enumeration of the Plants Collected by Dr. Thos. Morong in Paraguay 1888–1890. By Thomas Morong and N. L. Britton, with the assistance of Miss Anna Murray Vail (1892–1893). . . . . $1.50.

No. 36. An Examination of the Seeds of some Native Orchids. By Carlton C. Curtiss (1893), ... 25 cents.

No. 37. Further Notes on American Species of *Polygonum*. By John K. Small (1893), ... 25 cents.

No. 38. New or Noteworthy North American Phanerogams, VII. By N. L. Britton (1893), ... 25 cents.

The whole series with the exception of Nos. 2, 3, 6 and 10 will be supplied for $5.

Copies of the Catalogue of Plants found in New Jersey (1889), by N. L. Britton, may be had for $2.

Address

DR. THOS. MORONG,

Curator of the Herbarium, Columbia College,

NEW YORK CITY.